

Mission Incident
Santa Paula, CA
Preliminary Summary of Air Monitoring Results
December 21, 2014

Prepared by
Center for Toxicology and Environmental Health, L.L.C. (CTEH®)

Introduction

Center for Toxicology and Environmental Health, LLC (CTEH®) continued air monitoring in support of response activities following a vacuum truck explosion and fire in Santa Paula, CA.

This submittal summarizes air monitoring data for December 21, 2014 07:00 to December 22, 2014 07:00.

Real-time Air Monitoring

All instrumentation was calibrated at least once per day or per manufacturer's recommendations. Manually-logged real-time air monitoring was conducted for chlorine (Cl_2), hydrogen sulfide (H_2S), hydrochloric acid (HCl), percent of the Lower Explosive Limit (LEL), oxygen (O_2), peroxides, particulate matter (10 micron particles, PM_{10}), sulfur dioxide (SO_2), sulfuric acid (H_2SO_4), and volatile organic compounds (VOCs), with instruments such as Gastec® pumps with chemical-specific colorimetric tubes, RAESystems® MultiRAE Plus and MultiRAE Pro PID with chemical-specific sensors, and TSI® AM510s for particulate matter. Monitoring was conducted by CTEH® personnel in the work area, at fixed locations in the surrounding community, and along the perimeter of the facility in the community. Table 1 summarizes monitoring data for manually-logged real-time readings. Maps of the site location, fixed community real-time air monitoring locations, aerial site photo, and roaming monitoring are included in Appendix A.

CTEH® monitored RAESystems® AreaRAE units with ProRAE Guardian system at four locations on the fence line of the facility within the work area. Additional units (Unit 09 and Unit 10) were deployed in the cabs of excavators supporting solidification operations in the Exclusion Zone. AreaRAE Unit 11 was deployed on Mission Rock Road on the outer fence line of the Santa Clara Waste Water facility primarily to monitor Cl_2 concentrations between the 120 barrel tank truck and the road. Another unit (Unit 06) was deployed in conjunction with work operations near frac tanks as recommended by the onsite safety officer. AreaRAEs were equipped with sensors to detect Cl_2 , VOCs, LEL, H_2S , and SO_2 . Unit 11 recorded one instantaneous detection of Cl_2 at a concentration of 0.2 ppm; however, CTEH® personnel in the area did not detect Cl_2 using handheld instruments and determined this detection to be the result of electronic sensor drift. The Cl_2 sensor on this unit was recalibrated. Unit 02 recorded one instantaneous detection of H_2S of 3.5 ppm at 08:24 on 12/21. This concentration was not sustained, and no H_2S detections were observed with handheld instrumentation around the same time period. Unit 10, located in the cab of an excavator, recorded seven SO_2 detections ranging from 0.1 to 3.8 ppm. The operator was wearing an air-purifying respirator (APR) during this time. Table 2 summarizes monitoring data for AreaRAE monitoring. AreaRAE graphs displaying real-time air monitoring data as well as 15-minute rolling averages and a map depicting AreaRAE locations are included in Appendix B.

Particulate monitors were collocated with AreaRAE units 01, 02, 03, and 04 and data-logged to monitor PM_{10} . Table 3 summarizes data-logged particulate monitoring data.

Table 1: Manually-Logged Real-Time Air Monitoring Summary¹
December 21, 2014 07:00 – December 22, 2014 07:00

Location Category	Analyte	Instrument	No. of Readings	No. of Detections	Avg. of Detections	Detection Range ²
Community	Cl ₂	Gastec 8La	3	0	NA	<0.05 ppm
	H ₂ S	Gastec 4LL	1	0	NA	<0.1 ppm
		MR+ / MR Pro	14	0	NA	<1 ppm
	HCl	Gastec 14L	3	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	13	0	NA	<1 %
	O ₂	MR+ / MR Pro	13	13	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	3	0	NA	<0.1 ppm
	PM ₁₀	AM510/Dusttrak	13	13	0.012	0.008 - 0.023 mg/m ³
	SO ₂	MR+ / MR Pro	13	0	NA	<0.1 ppm
	H ₂ SO ₄	Gastec 35	3	0	NA	<0.2 mg/m ³
Work Area	VOC	MR+ / MR Pro	13	0	NA	<0.1 ppm
	Cl ₂	Gastec 8La	4	0	NA	<0.05 ppm
		MR+ / MR Pro	12	0	NA	<0.1 ppm
	H ₂ S	MR+ / MR Pro	5	0	NA	<1 ppm
	HCl	Gastec 14L	3	0	NA	<0.05 ppm
	LEL	MR+ / MR Pro	12	0	NA	<1 %
	O ₂	MR+ / MR Pro	7	7	20.9	20.9 - 20.9 %
	Peroxides	Gastec 32	4	0	NA	<0.1 ppm
	PM ₁₀	AM510/Dusttrak	7	7	0.024	0.01 - 0.041 mg/m ³
	SO ₂	MR+ / MR Pro	12	0	NA	<0.1 ppm
	H ₂ SO ₄	Gastec 35	2	0	NA	<0.2 mg/m ³
	VOC	MR+ / MR Pro	12	0	NA	<0.1 ppm

¹Note: The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format.

²Maximum detections preceded by the "<" symbol are considered non-detects below reporting limit to the right.

Table 2: AreaRAE Air Monitoring Summary¹
December 21, 2014 07:00 – December 22, 2014 07:00

Unit ID	Analyte	No. of Readings	No. of Detections	Avg. of Detections	Detection Range ²
Unit 01	H ₂ S	3886	42	0.1 ppm	0.1 - 0.3 ppm
	LEL	3886	0	NA	< 1 %
	SO ₂	3886	1	0.1 ppm	0.1 - 0.1 ppm
	VOC	3886	12	0.1 ppm	0.1 - 0.1 ppm
Unit 02	H ₂ S	3796	223	0.1 ppm	0.1 - 3.5 ppm
	LEL	3796	0	NA	< 1 %
	SO ₂	3796	0	NA	< 0.1 ppm
	VOC	3796	653	0.2 ppm	0.1 - 0.8 ppm
Unit 03	H ₂ S	3658	0	NA	< 1 ppm
	LEL	3658	0	NA	< 1 %
	SO ₂	3658	0	NA	< 0.1 ppm
	VOC	3658	245	0.2 ppm	0.1 - 0.4 ppm
Unit 04	H ₂ S	3810	61	0.1 ppm	0.1 - 0.1 ppm
	LEL	3810	0	NA	< 1 %
	SO ₂	3810	0	NA	< 0.1 ppm
	VOC	3810	45	0.1 ppm	0.1 - 0.2 ppm
Unit 06	H ₂ S	1447	0	NA	< 1 ppm
	LEL	1447	0	NA	< 1 %
	SO ₂	1447	0	NA	< 0.1 ppm
	VOC	1447	1	0.1 ppm	0.1 - 0.1 ppm
Unit 09	Cl ₂	1580	0	NA	< 0.1 ppm
	LEL	1580	0	NA	< 1 %
	SO ₂	1580	0	NA	< 0.1 ppm
	VOC	1580	840	0.3 ppm	0.1 - 0.8 ppm
Unit 10	Cl ₂	1549	1	0.2 ppm	0.2 - 0.2 ppm
	LEL	1549	0	NA	< 1 %
	SO ₂	1549	7	1.2 ppm	0.1 - 3.8 ppm
	VOC	1549	570	0.3 ppm	0.1 - 0.8 ppm
Unit 11	Cl ₂	3914	1	0.2 ppm	0.2 - 0.2 ppm
	LEL	3914	0	NA	< 1 %
	SO ₂	3914	71	0.1 ppm	0.1 - 0.3 ppm
	VOC	3914	352	0.1 ppm	0.1 - 0.4 ppm

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Table 3: AM510 PM₁₀ Monitoring Summary¹
December 21, 2014 07:00 – December 22, 2014 07:00

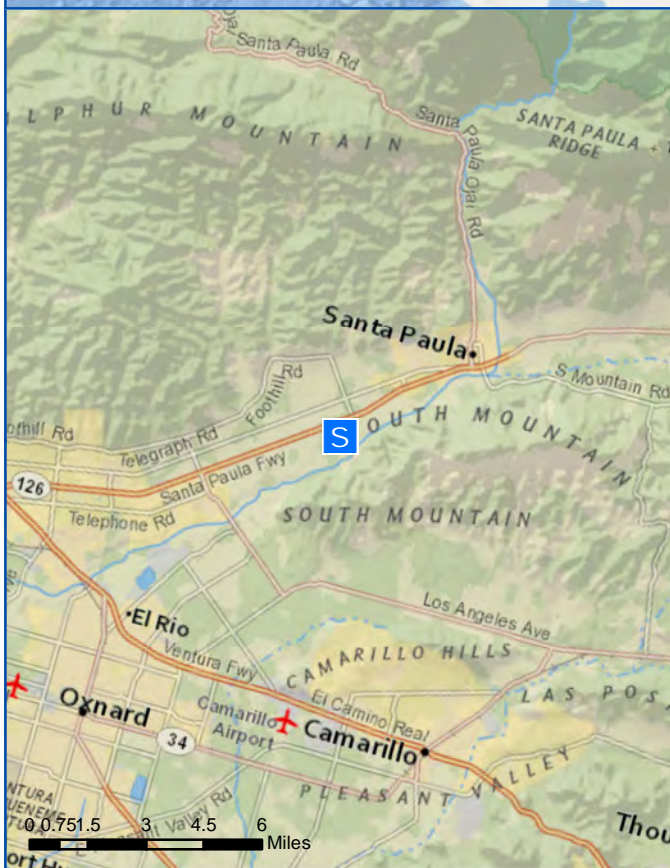
Serial No.	Location	No. of Readings	No. of Detections	Avg. Detection	Detection Range
10601072	AR01	978	978	0.011	0.006 - 0.099 mg/m ³
10408087	AR02	1364	1364	0.034	0.001 - 0.26 mg/m ³
10704074	AR03	2624	2624	0.016	0.004 - 0.865 mg/m ³
10503020	AR04	1415	1415	0.026	0.007 - 0.183 mg/m ³

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Appendix A

Incident Maps:

Real-time Air Monitoring Locations and Incident Site



Legend

 Site Location



0 50 100
Feet



0 250 500 1,000
Feet



Legend

-  FRT Location
-  Site Location









Legend

Monitoring Location

- Non-detect (< 1 %)
- S Incident Site

0 0.125 0.25 0.5 Miles



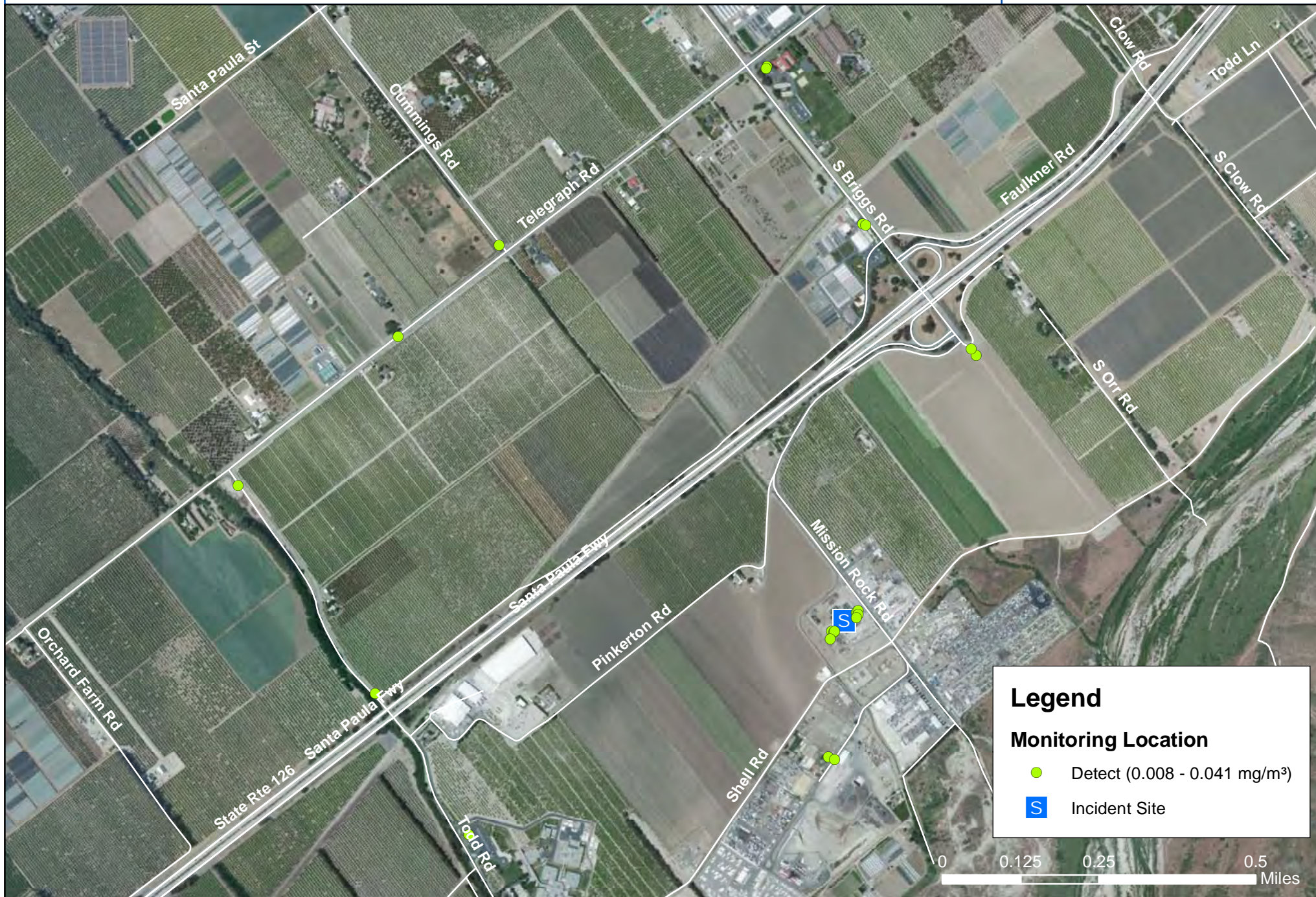
Legend

Monitoring Location

- Detect (20.9 %)
- S Incident Site

0 0.125 0.25 0.5 Miles









Legend

Monitoring Location

- Non-detect (0.2 mg/m³)
- S Incident Site





Legend

Monitoring Location

- Non-detect (< 0.1 ppm)
- S Incident Site

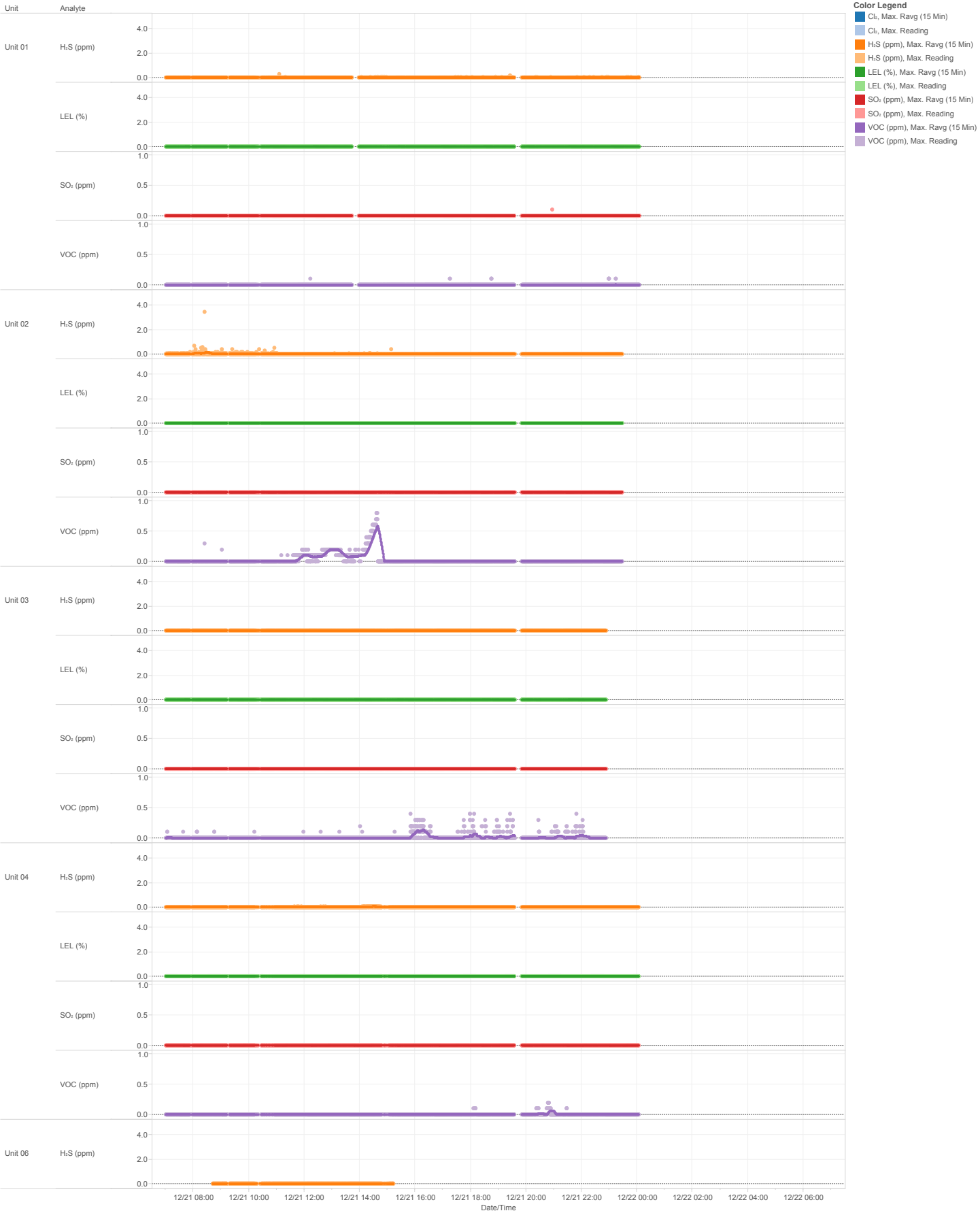
0 0.125 0.25 0.5 Miles

Appendix B:

AreaRAE Trend Graphs, AM510 Trend Graphs, and Location Map

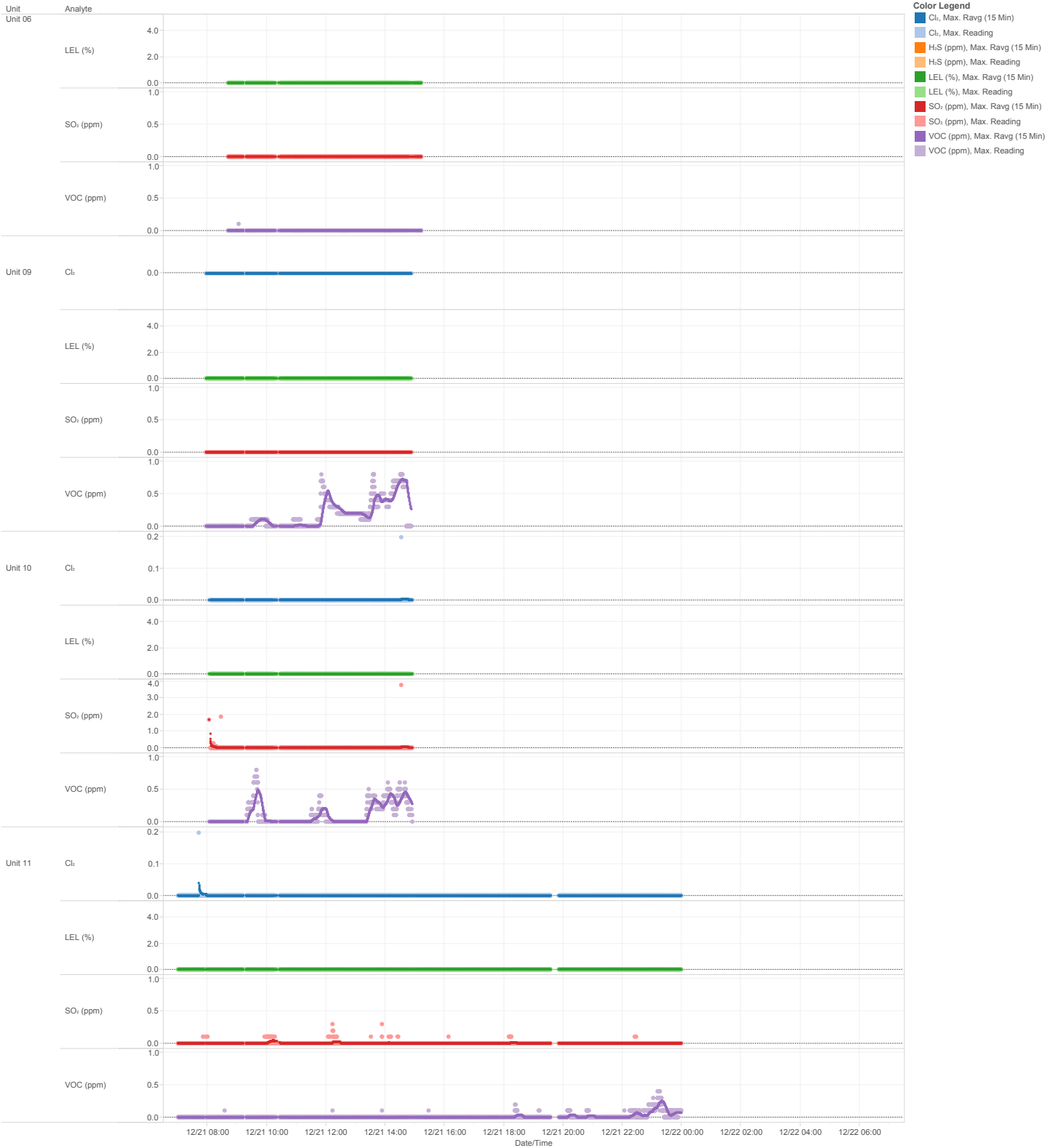


Patriot Environmental
AreaRAE Trend Graphs
12/21/2014 07:00 - 12/22/2014 07:00



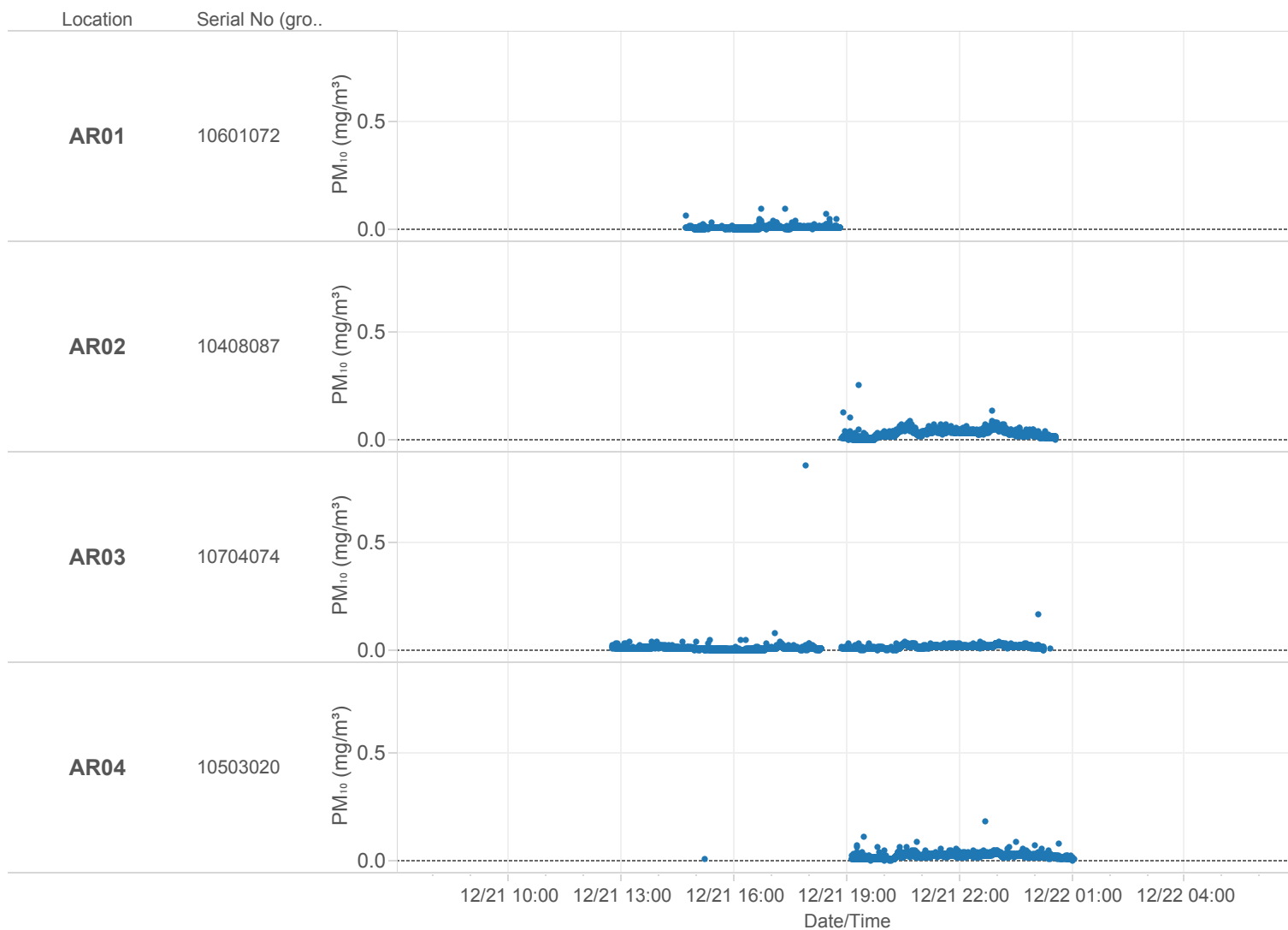
- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
AreaRAE Trend Graphs
12/21/2014 07:00 - 12/22/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format
- AreaRAE data may contain "drift events." Drift is defined as interference in the electrochemical sensor's ability to accurately report the concentration of a chemical in the atmosphere, resulting in "false positives"

Patriot Environmental
MISSION INCIDENT
Datalogged AM510 (PM₁₀) Summary
12/21/2014 07:00 - 12/22/2014 07:00



- The data set displayed here has not undergone complete QA/QC analysis and is presented in a preliminary format